
Chick chorioallantoic membrane assay as an in vivo model to study the effect of nanoparticle-based anticancer drugs in ovarian cancer.

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Public Summary:

New therapy development is critically needed for ovarian cancer. We used the chicken egg CAM assay to evaluate efficacy of anticancer drug delivery using recently developed biodegradable PMO (periodic mesoporous organosilica) nanoparticles. Human ovarian cancer cells were transplanted onto the CAM membrane of fertilized eggs, resulting in rapid tumor formation. The tumor closely resembles cancer patient tumor and contains extracellular matrix as well as stromal cells and extensive vasculature. PMO nanoparticles loaded with doxorubicin were injected intravenously into the chicken egg resulting in elimination of the tumor. No significant damage to various organs in the chicken embryo occurred. In contrast, injection of free doxorubicin caused widespread organ damage, even when less amount was administered. The lack of toxic effect of nanoparticle loaded doxorubicin was associated with specific delivery of doxorubicin to the tumor. Furthermore, we observed excellent tumor accumulation of the nanoparticles. Lastly, a tumor could be established in the egg using tumor samples from ovarian cancer patients and that our nanoparticles were effective in eliminating the tumor. These results point to the remarkable efficacy of our nanoparticle based drug delivery system and suggests the value of the chicken egg tumor model for testing novel therapies for ovarian cancer.

Scientific Abstract:

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